

circuitry adapted to measure a loop-related parameter including long term variation of DC voltage; and

wherein the controller provides diagnostic information based upon the loop-related parameter.

28.(Amended) A method of providing diagnostics on a fieldbus process communication loop, the method comprising:

indirectly coupling diagnostic circuitry to the fieldbus process communication loop;

measuring a parameter of the loop; and

analyzing the parameter to provide a diagnostic output.

29.(Amended) The method of claim 28 wherein analyzing the parameter includes performing a neural network analysis on the measured parameter.

30.(Amended) The method of claim 9, wherein analyzing the parameter further includes performing fuzzy logic upon the measured parameter.

31.(Amended) The method of claim 28, wherein analyzing the parameter includes performing fuzzy logic upon the measured parameter to provide the diagnostic output.

32.(Amended) The method of claim 28, wherein operably coupling diagnostic circuitry to the loop includes operably coupling the diagnostic circuitry to the loop via a loop communicator to allow the diagnostic circuitry to access data communicated by the loop communicator.

33.(Amended) The method of claim 28 wherein analyzing the parameter to provide a diagnostic output further comprises

applying a least squares method analysis to the measured parameter.

Please add new claims 34-37.

34. A field device coupleable to a fieldbus process communication loop, the device comprising;

a power module coupleable to the loop to power the device with energy received from the loop;

a loop communicator coupleable to the loop, and adapted to bi-directionally communicate over the loop;

a controller coupled to the loop communicator;

diagnostic circuitry coupled to the controller and operably coupleable to the loop, the diagnostic circuitry adapted to measure a loop-related parameter including long term variation of current drawn by the field device; and

wherein the controller provides diagnostic information based upon the loop-related parameter.

35. A field device coupleable to a fieldbus process communication loop, the device comprising;

a power module coupleable to the loop to power the device with energy received from the loop;

a loop communicator coupleable to the loop, and adapted to bi-directionally communicate over the loop;

a controller coupled to the loop communicator;

diagnostic circuitry coupled to the controller and operably coupleable to the loop, the diagnostic circuitry adapted to measure a loop-related parameter including a lowest signal source on the loop and a device ID and address of the lowest signal source; and

wherein the controller provides diagnostic information based upon the loop-related parameter.

36. A field device coupleable to a fieldbus process communication loop, the device comprising;
a power module coupleable to the loop to power the device with energy received from the loop;
a loop communicator coupleable to the loop, and adapted to bi-directionally communicate over the loop;
a controller coupled to the loop communicator;
diagnostic circuitry coupled to the controller and operably coupleable to the loop, the diagnostic circuitry adapted to measure a loop-related parameter including a quiescent noise level on the loop; and
wherein the controller provides diagnostic information based upon the loop-related parameter.

37. A field device coupleable to a fieldbus process communication loop, the device comprising;
a power module coupleable to the loop to power the device with energy received from the loop;
a loop communicator coupleable to the loop, and adapted to bi-directionally communicate over the loop;
a controller coupled to the loop communicator;
diagnostic circuitry coupled to the controller and operably coupleable to the loop, the diagnostic circuitry adapted to measure a loop-related parameter;
wherein the controller provides diagnostic information based upon the loop-related parameter;
wherein the diagnostic information is indicated from the loop communicator to a computerized

maintenance management system for work orders; and wherein the diagnostic information is selected to alert an operator to change control strategies.